United States
Department of
Agriculture

Forest Service

**Northeastern
Area**

The Wood In Transportation Program

'97 NA
STATUS REPORT

The Wood In Transportation Program
Fiscal Year 1997 Status Report

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A Word From Our Partners

Custer County, Idaho, Timber Bridge Project

This single-lane bridge, completed in 1992, was a cooperative effort by Custer County, the Lost River Highway District, and the Challis National Forest. The 50-by-14-foot bridge is located in Custer County, which is heavily dependent on agriculture, mining, logging, and recreation. The

Lost River Highway District supplied the labor and equipment to remove and dispose of the old bridge, prepare the site, erect the new superstructure, and reconstruct approximately 300 linear feet of new road alignment. Trus Joist MacMillan acted as technical consultant for erection of the bridge.

The bridge superstructure used T-sections made of Micro-Lam® laminated veneer lumber (LVL). These sections were prefabricated, pressure-treated, and hauled to the site on a single vehicle. The structure was designed in accordance with Idaho Department of Transportation and AASHTO standards.

Victor Johnson, Chairman of the Lost River Highway District, is satisfied with the bridge and highly recommends LVL timber bridges to other communities. He reports that *"There is not a thing wrong with the bridge, and timber is cheaper than other materials. This bridge will last forever, and I wish there were more of them."*

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Meriwether County Bridge Project

Meriwether County is a rural county about 60 miles southwest of Atlanta, Georgia. The Meriwether County Board of Commissioners used a grant from the USDA Forest Service to build a 40-foot, two-lane vehicular bridge. Forrest Hill, Two Rivers Resource Conservation and Development Council, coordinated the installation of the bridge in 1993. He believes this bridge design, with a glue-laminated longitudinal deck, is very cost-effective. The pressure-treated, southern pine bridge was installed by county inmates in three days. According to Mr. Hill, inmate labor was the key to saving the county money, and the inmates benefitted by learning a valuable job skill.

During installation, Mr. Hill observed the versatility of wood. The strength and stability of this bridge were proven when it withstood a 500-year flood in July 1994. Since that time, many county government officials have visited the bridge and were very impressed. Many are now interested in building timber bridges in their communities.

Continued on page 4

The Wood In Transportation Program

Formerly the National Timber Bridge Initiative

An Overview of The Wood In Transportation Program

Modern timber bridges combine today's technology with a renewable American resource. Advances in wood preservation and the design of wooden structures make the modern timber bridge an economical, safe, and attractive alternative for bridge construction in many situations. To date, the Wood In Transportation (WIT) Program has funded 374 modern timber bridges, 236 of which are complete. The WIT Program has also funded 75 special projects, 43 of which are now complete. Many of these special projects are focused on broadening the former National Timber Bridge Initiative into other WIT applications. In Fiscal Year 1996, the WIT Program developed guidelines for commercialization projects. The goal of these projects is to fully commercialize technology that has been successfully developed and demonstrated for transportation-related structures. WIT projects have assisted in improving the Nation's transportation system and have revitalized local economies. In Fiscal Year 1997, over 100 grant applications were received by the WIT Program. This shows the great interest and need in the Program.

Increasing interest in the demonstration cost-share program, combined with a growing demand for technical information, indicates there is a real desire for the services provided by the Program. As WIT technology moves into the future, the USDA Forest Service will continue to provide reliable leadership and direction in the sustainable use of our Nation's forest resources for transportation purposes well into the 21st century.

Table 1. *Fiscal Year 1997 Wood In Transportation Program Projects Funded.*

Type	Number	Federal Contribution	Cooperative Contribution
Vehicular	1	$50,000	$244,300
Pedestrian	5	42,700	145,600
Special Projects	6	158,400	164,800
Commercialization	2	174,500	217,100
Total	14	$425,600	$771,800

Table 2. *Completed Wood In Transportation Projects.*

Region	Vehicular	Pedestrian	Special Projects	Total
Northeastern	125	7	22	154
Southern	41	6	15	62
Western	50	7	6	63
Total	216	20	43	279

The Wood In Transportation Program
Fiscal Year 1997

Introduction

A significant opportunity exists in the United States to improve rural transportation networks and revitalize rural economies by using wood for bridges and other transportation structures. Approximately 35 percent of the 575,000 highway bridges across the Nation are in need of repair or replacement, consequently causing a severe burden on the economy.

Modern timber bridge technology provides an opportunity to rebuild this crumbling infrastructure. Many bridges, particularly those on double-lane, rural roads, are ideally suited for replacement with wood. Advances in wood treatment, engineered wood composite products, and bridge designs provide for the increased use of wood as a construction material to assist in the cost-effective rebuilding of our Nation's infrastructure.

To address this opportunity, the United States Congress funded the Wood In Transportation (WIT) Program, formerly known as the National Timber Bridge Initiative, beginning in Fiscal Year 1989. In Fiscal Year 1997, over 100 grant applications were received by the WIT Program. This shows the great interest and need in the Program. The purpose of this Status Report is to describe the WIT Program and its accomplishments to date.

Program Direction

During the first five years of the WIT Program, the focus primarily has been on vehicular bridges for highway use. However, because of increased interest and demand, the Program has broadened into other market segments, such as pedestrian and trail structures, portable bridges for temporary access, and railway structures. The WIT Program is also advancing into other products, such as retaining walls, box culverts, sound barriers, highway signs, and marine structures. The primary direction of the WIT Program is to diversify local economies by the following means:

- ❑ **Improving rural transportation networks, thus improving community vitality,**
- ❑ **Expanding the range of markets for wood products,**
- ❑ **Creating service industries for wood in transportation structures,**
- ❑ **Commercializing modern timber bridge technology,**
- ❑ **Utilizing community resources, i.e., local timber and local labor, and**
- ❑ **Improving America's forests through stewardship.**

Program Components

The WIT Program's goals and objectives are being achieved through four distinct, yet interrelated components.

- ❑ **Demonstration Wood In Transportation Projects**
- ❑ **Research**
- ❑ **Technology Transfer and Information Management**
- ❑ **Rural Revitalization**

Demonstration Projects

Timber Bridges — Demonstration timber bridges show people how wood and new technology provide alternatives to traditional bridge construction techniques and materials. Some bridges are constructed using local labor and local timber resources, thus stimulating the area's economy. Using local timber also improves the health of our forests by developing a use for low-valued wood. Many of the demonstration timber bridges are cost-competitive with other bridge materials primarily because of three factors.

- ❑ **Lower costs for material and construction**
- ❑ **Lower maintenance costs**
- ❑ **Lower life-cycle costs**

As of February 1997, 236 wooden vehicular and pedestrian bridges have been built with WIT assistance. The Program has funded a variety of timber bridge designs. One design consists of placing timbers on edge and holding them together by running threaded steel rods from one side to the other. Another type of design utilizes lumber glued together. Demonstration timber bridges have been constructed of hardwoods, softwoods, and a combination of the two.

Special Projects — The WIT Program began sponsoring special projects in 1992. Special projects demonstrate new technologies or methods for reducing transportation system costs. They also study markets or perceptions related to timber uses in transportation structures. Special projects enable cooperators to initiate endeavors or implement strategies that will stimulate local, regional, or national economies.

Special projects also provide an avenue for the WIT Program to broaden into other wood in transportation applications, such as timber binwalls, portable bridges for temporary access, and railroad infrastructure. Since 1992, 75 special projects have been funded. Copies of special project summaries funded from 1992 to 1996 are available from the Timber Bridge Information Resource Center (TBIRC). (See page 13.)

Commercialization Projects — In Fiscal Year 1996, the WIT Program started a new grant component — Commercialization projects.

The purpose of these projects is to foster the commercialization of modern timber bridge technology that has been developed during the

eight years of the Program. They will result in building and demonstrating the most cost-effective, structurally sound modern timber bridges. These projects will have area-wide or regional significance because the design used throughout a project area will be standardized to the greatest extent that is practical. Two key concepts of these projects are: 1) to develop cooperative partnerships that join public and private entities and 2) to promote productive efforts that satisfy local transportation needs and stimulate local economic vitality.

In Fiscal Year 1997, the USDA Forest Service awarded $174,500 for two Commercialization projects. One of these projects will result in five cost-effective, cottonwood glulam decks on steel stringers being built in Johnson County, Iowa. The second project is located in Bay County, Florida. It utilizes standard plans for stress-laminated timber bridges that were developed at the Forest Products Laboratory in Madison, Wisconsin.

Research

The use of wood as a constuction material is being researched to optimize the balance between existing and constantly developing technology. The goal is to ensure that current and future design and construction methods receive the optimum benefit of newly developed technology. Major research activities are based on the six-year needs assessment initiated in 1990 by the USDA Forest Products Laboratory (FPL) at Madison, Wisconsin, and the Federal Highway Administration (FHwA). The study identified more than 100 research needs. Some of the more important needs were to: 1) develop crash-tested bridge rails for longitudinal and transverse timber decks, 2) prepare guidelines and standard design details for designing modern timber bridges for minimum maintenance and long life, and 3) develop economical, easy-to-use equipment and methods to conduct nondestructive testing of in-place timber bridge components, including piles.

The research effort is cooperative in nature. At the core of the research effort are the FPL and the FHwA. Their collaborators include West Virginia University, the University of Nebraska, the University of Wisconsin, Mississippi State University, Auburn University, and other universities throughout the country.

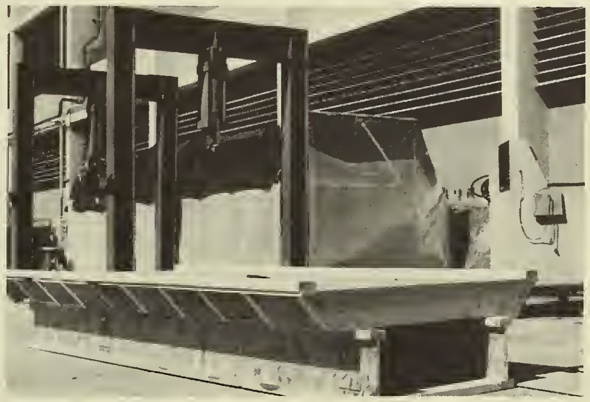
The WIT Program is providing an opportunity for universities to design and develop new timber bridge systems. This research effort has prompted provisional adoption of stress-deck design criteria by the American Association of State Highway and Transportation Officials (AASHTO). Adoption of these design criteria has provided uniform standards for slab deck designs across the country.

Monitoring the performance of selected demonstration bridges and bridges on National Forest System land is necessary to develop and further refine economical, structurally sound designs that will ultimately meet the approval of AASHTO. Monitoring activities typically include a two-year assessment of wood moisture content and rod stress levels, one or more load test(s), and intense visual inspection. Bridge monitoring is currently in progress on many demonstration bridge projects throughout the country to assess field performance of various designs. All of these activities provide information that helps improve design procedures, fabrication, construction, and erection methodologies.

Word continued ...

National Timber Bridge Design Competition

The National Timber Bridge Design Competition is a project partially funded by the Wood In Transportation Program. The student competition promotes the use of wood as a competitive bridge construction material, generates innovative and cost-effective timber bridge design techniques, and fosters an appreciation of the engineering capabilities of wood. The first competition was held in 1992. The event involves more than 100 students each year.



Bennie Hutchins, Southwest Mississippi Resource Conservation and Development, Inc., coordinator of the event, states, *"I have no doubt that the competition achieves its objectives, and I always receive positive feedback."* Mr. Hutchins selects three different judges each year, and he makes an effort to include individuals from private industry and academia as well as transportation officials. *"Even though it's hard to measure the impact the design competition has on those not involved with timber, I believe the engineering and transportation communities are becoming interested."*

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Technology Transfer and Information Management

It is essential that the WIT Program be accessible to the public, including highway officials, bridge engineers, and community decisionmakers. For this Program to be successful, information about uses of wood in transportation must be transferred and distributed to others. The Timber Bridge Information Resource Center (TBIRC), located in Morgantown, West Virginia, helps administer the WIT

Program. The Center also identifies emerging technologies and stores, retrieves, and disseminates information to meet the needs of managers, planners, designers, builders, engineers, and others.

Besides overall program management, there are several primary activities occurring at the Center.

- ❑ **Administration of the demonstration grant program**
- ❑ **Facilitation of technology transfer**
- ❑ **Technical assistance**
- ❑ **Coordination of conferences, workshops, and seminars**
- ❑ **Information distribution**
- ❑ **Coordination with field coordinators**

As part of the technology transfer effort, the TBIRC has developed several case studies in Fiscal Years 1996-1997. Two highlights of this effort are: *"Portable Timber Bridges: An Eco-friendly Solution for Stream Crossings"* and *"Design and Construction of the Pochuck Quagmire Suspension Bridge on the Appalachian Trail."*

The case study on portable timber bridges informs readers about the benefits of their use. They are relatively easy to manufacture, transport, install, and use for temporary access during harvesting operations. The portable timber bridge publication focuses on longitudinally stress-laminated timber bridges that were designed, constructed, installed, and evaluated at the West Virginia University Forest. Users of these bridges believe they are a cost-effective alternate for minimizing environmental degradation.

The suspension trail bridge case study presents the planning and construction of a pedestrian trail bridge on the Appalachian Trail. The NY-NJ Trail Conference, a non-profit organization, was able to build this bridge because of the public-private partnership that exists between many entities. The goal of this publication is to provide basic engineering design criteria and construction tips, as well as material, machinery, and people costs and needs.

Responding to the need expressed by bridge engineers and government decisionmakers for up-to-date information on modern timber bridge construction, the USDA Forest Service prepared and published a design and construction manual, which can be acquired from the TBIRC. Other publications offered by the Center include *Crossings*, the quarterly newsletter of the WIT Program; *Timber Bridge Superstructure Cost Report; and Contacts Report on Demonstration Project Cooperators.*

Many publications developed by the Forest Products Laboratory, such as *Standard Plans for Southern Pine Bridges*, *Plans for Crash-Tested Bridge Railings for Longitudinal Wood Decks,* and a variety of monitoring reports are also available. In Fiscal Year 1996, about 41,000 pieces of wood in transportation information were distributed by the TBIRC.

Rural Revitalization

The WIT Program aims to stabilize and revitalize the economic well-being of rural economies through service industry development and market expansion. It strives to provide greater economic diversity and stability for rural communities. As part of the overall effort of the USDA Forest Service — State and Private Forestry's Economic Action Programs, WIT provides a tangible, efficient example of how local economies can be expanded and revitalized.

Typical activities include:

- ❑ **Emphasizing historically underutilized wood in the construction of Wood In Transportation structures,**
- ❑ **Creating local jobs and long-term employment prospects, and**
- ❑ **Creating additional service industries by utilizing community resources, i.e. local timber and local labor.**

WIT projects link local, regional, and national markets. They support business expansion while allowing commuters, travelers, and shoppers to reach their destinations. Enhanced economic activity serves the public sector by generating additional revenue through sales, property, and income taxes. Wood in transportation structures can be a base for sustained economic growth by employing local labor to fabricate and erect bridges and related projects made from local timber.

Budget

A history of the funding provided to major components of the WIT program is presented below.

Table 3. *Funding history of the Wood In Transportation Program, Fiscal Years 1989 through 1997.*

Goal	Combined 1989-1991 Final	1992 Final	1993 Final	1994 Final	1995 Final	1996 Final	1997 Final	1998 Planned
				...Dollars in thousands...				
Demonstration Projects	$5,990	$2,002	$1,005	$1,009	$1,020	$ 604	$ 447	$ 500
Research	2,189	1,038	1,129	1,093	1,100	770	650	650
Technology Transfer	2,050	703	770	732	671	596	753	700
TOTAL	**$10,229**	**$3,743**	**$2,904**	**$2,834**	**$2,791**	**$1,970**	**$1,850**	**$1,850**

Key Contacts: Wood In Transportation Coordinators

Administration of the WIT Program is assigned to the Northeastern Area, State and Private Forestry. Field locations are Morgantown, West Virginia (TBIRC), and selected Forest Service Regional Offices (Program Coordinators). The research component of the Program is administered at the Forest Products Laboratory in Madison, Wisconsin.

Forest Service technical advisors are located throughout the country to help implement the WIT Program. Program Coordinators are responsible for:

- **Coordinating the demonstration WIT proposal process,**
- **Coordinating local conferences, workshops, and seminars,**
- **Providing technical assistance and disseminating information to potential users, and**
- **Providing information to the TBIRC.**

Following is the list of Wood In Transportation Coordinators:

Name	States Served	Location	Telephone
Stephen Bratkovich	IA, IL, IN, MI, MN, MO, WI	St. Paul, MN	(612) 649-5246
Edward Cesa	DE, MD, NJ, OH, PA, WV	Morgantown, WV	(304) 285-1530
Robert Dettmann	CO, KS, NE, SD, WY	Lakewood, CO	(303) 275-5741
Dean Graham	N. ID, MT, ND	Missoula, MT	(406) 329-3521
Von Helmuth	CA, HI	San Francisco, CA	(415) 705-2678
Dean Huber	CT, MA, ME, NH, NY, RI, VT	Durham, NH	(603) 868-7689
Karen Kenna	AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA	Atlanta, GA	(404) 347-7206
Kenneth Kilborn	AK	Anchorage, AK	(907) 271-2862
Larry Roybal	AZ, NM	Albuquerque, NM	(505) 988-6932
Keith Schnare	S. ID, NV, UT	Ogden, UT	(801) 625-5260
William Von Segen	OR, WA	Portland, OR	(503) 326-7776

Wood In Transportation Conferences

Wood In Transportation information and technology has been made available to potential users at formal conferences. An estimated 14,000 state and county officials, engineers, and involved citizens have participated in these forums since the WIT Program's beginning. To date, 48 formal conferences have been held within the guidelines of the WIT Program, and more are tentatively scheduled.

The Demonstration Wood In Transportation Investment

The Demonstration Wood In Transportation Program provides a tangible forum to discuss the advantages and disadvantages of wood versus other construction materials. Competitive cost-share proposals have allowed the funding of 374 bridges, 75 special projects, and 4 commercialization projects.

Accomplishments of the Wood In Transportation Program

The following table illustrates the expenditures for demonstration Wood In Transportation projects for Fiscal Years 1989 through 1997.

Table 4. *Demonstration Wood In Transportation Projects for Fiscal Years 1989 through 1997*.*

Goal	Combined 1989-1991 Final	1992 Final	1993 Final	1994 Final	1995 Final	1996 Final	1997 Final	Total
			...Dollars in thousands...					
Vehicular Bridges:	(178)	(45)	(27)	(39)	(21)	(12)	(1)	(323)
Federal Contribution	$5,990	$1,902	$909	$935	$654	$496	$50	$10,936
Cooperative Contribution	10,458	3,984	2,111	1,884	987	739	244	20,407
Subtotal	**$16,448**	**$5,886**	**$3,020**	**$2,819**	**$1,641**	**$1,235**	**$294**	**$31,343**
Pedestrian Bridges:	-	(12)	(10)	(8)	(9)	(7)	(5)	(51)
Federal Contribution	-	$100	$ 96	$ 74	$ 90	$ 64	$43	$ 467
Cooperative Contribution	-	149	516	426	263	122	146	1,622
Subtotal		**$249**	**$612**	**$500**	**$353**	**$186**	**$189**	**$2,089**
Special Projects:	-	(11)	(13)	(18)	(16)	(11)	(6)	(75)
Federal Contribution	-	$183	$197	$380	$338	$323	$158	$1,579
Cooperative Contribution	-	290	809	624	660	407	165	2,955
Subtotal		**$473**	**$1,006**	**$1,004**	**$998**	**$730**	**$323**	**$4,534**
Commercialization Projects:	-	-	-	-	-	(2)	(2)	(4)
Federal Contribution	-	-	-	-	-	$145	$174	$319
Cooperative Contribution	-	-	-	-	-	405	217	622
Subtotal	-	-	-	-	-	**$550**	**$391**	**$941**
Total Dollars	**$16,448**	**$6,608**	**$4,638**	**$4,323**	**$2,992**	**$2,701**	**$1,197**	**$38,907**

* For Fiscal Years 1992 through 1996, total Forest Service demonstration project funding is greater than the total shown in Table 3. The difference in Table 4 reflects additional projects that were funded from returned grant dollars.

The table that follows illustrates the total federal funding, by state, for demonstration timber bridge projects since the beginning of the WIT Program. The table does not include bridges on National Forest System lands, special projects, or commercialization projects.

Table 5. *Total Federal Funding for Demonstration Vehicular and Pedestrian Timber Bridge Projects, Fiscal Years 1989 through 1997.*

State	FY 1989-96 Funding	FY 1989-96 # of Bridges	FY 1997 Funding	FY 1997 # of Bridges	Total Funding	Total # of Bridges
Alabama	$ 583,024	15	$ 0	0	$ 583,024	15
Alaska	215,135	7	0	0	215,135	7
Arizona	155,950	6	0	0	155,950	5
Arkansas	212,850	7	0	0	212,850	7
California	105,600	5	0	0	105,600	5
Colorado	190,600	6	0	0	190,600	6
Connecticut	73,500	3	0	0	73,500	3
Delaware*	0	0	0	0	0	0
District of Columbia	40,000	2	0	0	40,000	2
Florida	146,500	6	0	0	146,500	6
Georgia	288,150	11	9,440	1	297,590	12
Guam*	0	0	0	0	0	0
Hawaii*	0	0	0	0	0	0
Idaho	244,400	9	0	0	244,400	9
Illinois	186,800	6	0	0	186,800	6
Indiana	88,600	3	0	0	88,600	3
Iowa	135,500	5	0	0	135,500	5
Kansas	240,000	8	0	0	240,000	8
Kentucky	116,500	4	0	0	116,500	4
Louisiana	259,300	16	0	0	259,300	16
Maine	98,900	4	0	0	98,900	4
Maryland	274,300	8	0	0	274,300	8
Massachusetts	62,000	2	0	0	62,000	2
Michigan	595,850	19	0	0	595,850	19
Minnesota	149,000	3	0	0	149,000	3
Mississippi	248,300	9	0	0	248,300	9
Missouri	70,000	3	0	0	70,000	3
Montana	175,500	7	0	0	175,500	7
Nebraska	168,627	4	0	0	168,627	4
Nevada	30,000	1	0	0	30,000	1
New Hampshire	72,000	3	0	0	72,000	3
New Jersey	90,550	3	0	0	90,550	3
New Mexico	85,975	4	50,000	1	135,975	5
New York	504,289	18	0	0	504,289	18
North Carolina	25,000	1	0	0	25,000	1
North Dakota	141,750	5	0	0	141,750	5
Ohio	287,231	9	0	0	287,231	9
Oklahoma	210,862	8	0	0	210,862	8
Oregon	238,000	6	0	0	238,000	6
Other Pacific Islands*	0	0	0	0	0	0
Pennsylvania	490,000	28	0	0	490,000	28
Puerto Rico*	0	0	0	0	0	0
Rhode Island	58,555	3	10,000	1	68,555	4
South Carolina	72,900	3	0	0	72,900	3
South Dakota	89,600	3	0	0	89,600	3
Tennessee	119,300	5	10,000	1	129,300	6
Texas	39,400	2	0	0	39,400	2
Utah	87,200	5	0	0	87,200	5
Vermont	55,800	2	0	0	55,800	2
Virgin Islands*	0	0	0	0	0	0
Virginia	100,000	5	0	0	100,000	5
Washington	157,500	6	0	0	157,500	6
West Virginia	2,917,426	61	13,260	2	2,930,686	63
Wisconsin	156,700	4	0	0	156,700	4
Wyoming	154,110	5	0	0	154,110	5
Total	$11,309,034	368	$92,700	6	$11,401,734	374

* Guam, Hawaii, Other Pacific Islands, Delaware, Puerto Rico, and Virgin Islands have not received funding for Demonstration Timber Bridges under the Wood In Transportation Program.

Table 6. *Total Federal Funding for Special Projects, Fiscal Years 1989 through 1997.*

State	FY 1989-96 Funding	FY 1989-96 # of Sp. Projects	FY 1997 Funding	FY 1997 # of Sp. Projects	Total Funding	Total # of Sp. Projects
Alabama	$18,400	1	0	0	$18,400	1
Alaska	49,910	1	0	0	49,910	1
Arizona	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0
California	0	0	0	0	0	0
Colorado	20,000	1	0	0	20,000	1
Connecticut	0	0	0	0	0	0
Delaware*	0	0	0	0	0	0
District of Columbia	10,000	1	0	0	10,000	1
Florida	0	0	0	0	0	0
Georgia	20,000	1	0	0	20,000	1
Guam*	0	0	0	0	0	0
Hawaii*	0	0	0	0	0	0
Idaho	0	0	0	0	0	0
Illinois	0	0	0	0	0	0
Indiana	0	0	11,000	1	11,000	1
Iowa	42,500	2	0	0	42,500	2
Kansas	6,200	1	2,000	1	8,200	2
Kentucky	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0
Maine	10,000	1	0	0	10,000	1
Maryland	11,500	1	0	0	11,500	1
Massachusetts	50,000	2	0	0	50,000	2
Michigan	19,300	2	0	0	19,300	2
Minnesota	0	0	0	0	0	0
Mississippi	123,000	11	0	0	123,000	11
Missouri	0	0	0	0	0	0
Montana	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0
Nevada	0	0	0	0	0	0
New Hampshire	12,500	1	0	0	12,500	1
New Jersey	0	0	30,000	1	30,000	1
New Mexico	18,886	1	0	0	18,886	1
New York	137,300	5	0	0	137,300	5
North Carolina	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0
Ohio	5,000	1	0	0	5,000	1
Oklahoma	0	0	0	0	0	0
Oregon	20,000	1	0	0	20,000	1
Other Pacific Islands*	0	0	0	0	0	0
Pennsylvania	138,720	7	0	0	138,720	7
Puerto Rico*	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0
Texas	0	0	0	0	0	0
Utah	0	0	0	0	0	0
Vermont	30,000	1	0	0	30,000	1
Virgin Islands*	0	0	0	0	0	0
Virginia	143,123	7	0	0	143,123	7
Washington	15,000	1	0	0	15,000	1
West Virginia	478,685	16	115,400	3	594,085	19
Wisconsin	40,000	3	0	0	40,000	3
Wyoming	0	0	0	0	0	0
Total	$1,420,024	69	$158,400	6	$1,578,424	75

* Guam, Hawaii, Other Pacific Islands, Delaware, Puerto Rico, and Virgin Islands have not received funding for Special Projects under the Wood In Transportation Program.

The Wood In Transportation Outcomes

- More than 230 modern timber bridges constructed that demonstrate improved engineering designs and advanced preservative treatment techniques.
- More than 40 special projects completed. Many demonstrate the use of timber in other wood in transportation applications, such as retaining walls, portable bridges for temporary access, and marine structures.
- Increased awareness among highway officials and bridge engineers about modern timber bridges.
- Developed informative, easy-to-understand timber bridge manual and related technical information.
- Comprehensive monitoring program implemented.
- Developed designs using underutilized timber.
- Certification of hardwood species for structural uses.
- Approximately 41,000 pieces of information distributed by TBIRC in Fiscal Year 1996.
- *"Crossings"* newsletter — 4,500 distributed quarterly.
- Initiated commercialization.

The Wood In Transportation Outlook Fiscal Year 1998

In the next year, the WIT Program will explore the following:

- Commercialization of existing technology that has been developed since Fiscal Year 1989.
- Continuation of research efforts that will further refine the performance and cost-competitiveness of transportation structures using locally available timber resources.
- Increased information and educational efforts:
  - enhancement of TBIRC library
  - availabilty of technical information to the public through electronic mediums (i.e. INTERNET).
- Broadening timber bridge technology into other areas of transportation related uses, such as rails-to-trails projects, railways, docks and marine facilities, sign and light posts, portable timber bridges, culverts, sound barriers, retaining walls, and railings.
- Continued promotion of the WIT Program as an important tool in the stewardship of America's forests.

Selected Timber Bridge Information

The information provided below lists the potential advantages of wood for bridge replacement.

Wood type	Most tree species.
Amount of wood	15,000 board feet [32 ft. (W) by 30 ft. (L) span].
Maintenance	Low; no painting of treated timbers.
Chemical Effects	Wood is not affected by de-icing chemicals.
Life expectancy	30-50 years (see references).
Construction time	Minimal.
Use	All road systems — can be designed to carry all traffic loads.
Treatments	Basic wood preservative treatments are approved by the Environmental Protection Agency.

References

The following references provide additional information about modern timber bridges:

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McCurdy Road Bridge Project

The McCurdy Road Bridge Project, in Richland County, Ohio, was implemented to develop designs and methods for the construction of small bridges on rural, lightly-traveled county roads. The bridge was installed in 1995 with partial funding by the Wood In Transportation Program. It was co-sponsored by the Richland County Engineer's Office and the Erie Basin Resource Conservation and Development Council. The 16-foot timber bridge, which meets the American Association of State Highway and Transportation Officials (AASHTO) design standards, was built and installed by county personnel and equipment. The bridge was constructed of southern pine.

Charles Hill, Richland County chief deputy engineer, is very satisfied with the demonstration timber bridge. *"The project did exactly what it was intended to do. It provided information on low-cost timber material and brought a useable bridge into existence,"* Hill states. This project gave him and his highway personnel first-hand experience at building a bridge themselves without problems or delays. He is planning on building more timber bridges to replace existing deteriorating bridges.

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Double-Diffusion Treatment Plant - Tyonek Native Corporation, Alaska

This special project funded in FY 1995 assisted in the development of an innovative preservative treatment facility for local timber species in Alaska. The treatment plant uses a double-diffusion process for preserving local timber species. The double-diffusion process involves double-dipping green lumber in sodium fluoride and copper sulfate. The chemicals penetrate the wood and prevent decay.

Kevin Curtis, Manager of the Wood Products Division of Tyonek Corporation, says the plant will provide long-term employment for area residents. Located in the native village of Tyonek, the plant, according to Mr. Curtis, should make Alaska more self-sufficient by decreasing its reliance on imported timber. The plant will use white spruce, which is a locally available, under-utilized species.

Mr. Curtis also states that the plant will supply the lumber for other wood in transportation projects in the region. Two bridges are currently being designed and fabricated on Tyonek land, and a third one is being developed nearby. Because of these initiatives, access will be gained to additional Tyonek land and to other resources on the land. The plant, completed in June 1996, had a relatively low initial cost and will be *"inexpensive and easy to operate,"* reports Mr. Curtis.

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